1. Acœla. With digestive internal substance; without differentiation of a digestive tract and parenchym tissue. Without nervous system or excretory organs. All forms as yet known provided with an otolith.

2. Rhabdocœla. Digestive tract and parenchym tissue differentiated; a roomy body cavity usually present in which the regularly-shaped intestine is suspended by a small amount of parenchym tissue. With nervous system and excretory organ. Generative organs hermaphrodite (except in Microstoma and Stenostoma). Testes, as a rule, two compact glands. The female glands present as ovaries only, ovario-vitelligenous glands, or separate ovaries and yelk glands. Genital glands separated from the body parenchym by a special tunica propria. Pharynx always present, and very variously constructed. Otolith absent in most cases.

3. Alloiocœla. Digestive tract and parenchym tissue differentiated, but the body cavity much reduced by the abundant development of the latter. With nerve system and excretory organ. Generative organs hermaphrodite, with follicular testes and paired female glands, either ovaries only, or ovario-vitelligenous glands, or separate ovaries and yelk glands. Yelk glands irregularly lobular, rarely partially branched. Genital glands almost always without any tunica propria, lodged in the spaces in the body parenchym. Penis very uniform, and either without chilinous copulatory organs, or with these very little developed. Pharynx a pharynx variabilis or plicatus. Digestive tract lobular, or irregularly broadened out. All marine except one, or possibly two species.

Under the Alloiocœla come the genera—Plagiostoma, Vorticeros, Monotus, and others.

The work commences with a complete list of the literature on Turbellarians from the time of Trembley, who, in 1744, figured a black fresh-water Planarian to that of the publication of the last of Dr. Arnold Lang's important memoirs last year. The list is followed by a general treatise on the anatomy and physiology of the Rhabdocælida. The account of the nematocysts of some forms is very interesting; their exact resemblance to those of Cœlenterata is fully borne out. *Microstonum lineare* appears to be the only species which, like Hydra and Cordylophora, possesses two kinds of nematocysts. The author thinks he has been able to detect on the surface of the cuticle, trigger hairs in connection with the nematocysts, like those in Hydroids. He considers the rhabdites or rod-bodies homologous with nematocysts, and refers, in connection with this question, to the nematocysts devoid of any thread which occur in many Cœlenterates, intermingled with fully developed ones. The structure of the pharynx is carefully gone into, and its different forms being of much use in classification, receive various names, such as *Pharynx bulbosus*, *P. plicatilis*, &c.

The water vascular system has been studied by von Graff with considerable success. It may consist of a single median main canal with a single posterior opening (Stenostoma) or a pair of laterally-placed canals with a similar single opening or two separate lateral canals with each a posterior opening (Derostoma), or there may be a pair of openings or a single one somewhat anteriorly placed. Ciliated funnel cells or flame cells such as exist in Cestodes, Trematodes, and Triclad Dendrocœles, have been discovered by von Graff also in the Rhabdocœlida. They do not, however, occur in connection with the tips of the ramifications of the water vascular canals, but almost entirely on the larger canals forming the networks. It is impossible here to follow the work further, through the interesting sections devoted to the development of Microstoma by budding, the habits of life and geographical distribution of the Rhabdocælida. In connection with the discussion on classification, a table of the pedigree of Turbellaria is given, with Proporus as the ancestral starting-point. In this family tree the Dendrocœles are shown as derived from Acmostoma, a new genus of Alloiocœla, characterised by having a distinctly marked narrow ambulacral sole, the Polyclada directly, and the Triclada through Plagiostoma. The ascertained facts as to the structure of Turbellarians seem to point even more closely to their connection with the Cœlenterata. The presence of two kinds of nematocysts in one of the Rhabdocœla and possible occurrence in members of that group of trigger hairs, is a remarkable fact. Dr. Lang, believing that a part of the nervous system in Dendrocœles is truly mesenchymatous as in Ctenophora, and from other grounds concludes with Kowalewsky that the Polyclada are "creeping Cœlenterates which have many points of structure in common with the Ctenophora, some with the Medusæ. Such being the case, naturalists await with great impatience Kowalewsky's promised further information as to his extraordinary Cœloplana, supposed intermediate between Ctenophora and Dendrocœlida. The peculiar azygos character of the otolith in so many Dendrocœlida may perhaps be explained by the similar condition of the sense organ in Cœloplana. Prof. von Graff is much to be congratulated on the completion of this most important and admirable work.

H. N. MOSELEY

NOTES

WE greatly regret to announce the death of Mr. Charles V. Walker, F.R.S., at his residence at Tunbridge Wells, on the morning of December 24, 1882, in the seventy-first year of his age. Mr. Walker had been Telegraph Engineer to the South-Eastern Railway, since 1845. He had been a most zealous worker in the science of electricity, as the many works he leaves behind will testify. Indeed, he was one of the oldest telegraph engineers in the country, was the inventor of several useful appliances in connection with telegraphy, including the instruments by which the block system on railways is worked. His name is especially associated with the origin of the distribution of time by telegraph. On May 10, 1849, Mr. Glaisher wrote to Mr. Walker that he wished to talk with the latter about the laying down of a wire from the Observatory to the Lewisham Station, and on May 23 following, the Astronomer-Royal gave Mr. Walker a brief sketch of the use to be made of the wire referred to, his scheme, as he stated, being "the transmission of time by galvanic signal to every part of the kingdom in which there is a galvanic telegraph from London." It was proposed to lay four wires underground from the Royal Observatory to the railway station at Lewisham, and to extend them to London Bridge. The South-Eastern Railway Company gave every facility. On September 16, 1852, an electric clock at London Bridge Station was erected, and connected by wire with an electric clock at the Royal Observatory, Greenwich. The first time-signal sent from the Royal Observatory was received at London Bridge Station at 4 p.m. on August 5, 1852; and on August 9, 1852, Dover received a time-signal for the first time from the Royal Observatory direct, and it was made visible at certain first-class stations between London and Dover. After that the system rapidly spread, its success depending greatly on the scientific skill and enthusiasm of Mr. Walker. For some account of the subsequent development of the system, the reader may refer to the articles in NATURE, vol. xiv. pp. 50 and 110. Mr. Walker was treasurer of the Royal Astronomical Club for several years, and at the time of his death was president of the Society of Telegraph Engineers.

THE death is announced of Prof. Listing of Königsberg.

THE honour of Companion of the order of the Indian Empire has been conferred upon Surgeon-Major George Bidie, Superintendent of the Central Museum at Madras.

AT the last sitting of the year 1882, the Paris Academy of Sciences elected M. Bunsen, of Heidelberg, a Foreign Associate. M. Bunsen was already a Correspondent in the Section of Chemistry, and he will fill the place vacated by the death of M. Wöhler. It should be remembered that, contrary to the rule for members, who must be French citizens, and Associates, who must be foreigners, the correspondents of the Academy can be elected without any qualification of nationality; but none of them, either French subjects or foreigners, may live in Paris previous to their nomination. This rule is so strict that it is stated that an eminent man of science, wishing to become a candidate, removed his home from Paris to Versailles; and having been successful, returned to Paris, where he now lives.

THE Duc d'Aumale has been elected President of the Académie Française. M. Blanchard, the naturalist, will be President of the Academy of Sciences for 1883; he was vice-president during the past year. The vice-president for 1883, and future president for 1884 would be elected on Tuesday from the Mathematical Section. Before leaving the chair M. Jamin will, according to precedent, read a list of losses experienced by the Academy in 1882, and of the nominations made during the same period; he will also give a *résumé* of the progress of the several publications of the Academy.

ON Tuesday January 2, there was a gathering of people interested in educational progress, at No. 1, Byng Place, Gordon Square, to inspect the College Hall of Residence for Women Students which has lately been established there. Complete as this hall is in itself, we understand that it is only provisional until sufficient approval and support have been obtained to justify the opening of a building capable of accommodating a larger number of ladies. We may, however, regard it as embodying the idea of its founders, and as supplying in miniature a model of that comfortable and well-adapted academic residence which it is their object to provide for female undergraduates and art-students in London. The advantages to the members of this rapidly-increasing class of entering such a hall instead of taking separate lodgings or rooms in a boarding-house, or even living at home (in many cases) are not far to seek. Students in lodgings often suffer from neglect of health and under-feeding, while those who work at home are subject to interruptions and the strain of conflicting claims; and although they might avoid both these drawbacks in a good boarding house, they would still find that their residence was not adapted to the needs of student life. Whichever plan is adopted, girls generally lack opportunities of free intercourse with minds whose training has been about equal to their own, such as of late years they have been able to obtain at Oxford and Cambridge, and which is specially needed in London, the seat of the only English University that as yet admits them formally to degrees. Hence the three greatest benefits of the new hall will be: first, to bring the women students of London into social and intellectual fellowship, and thus to improve the quality of their work by encouraging conference on the subjects of study, without which it is hardly possible to acquire and test accuracy of thought; secondly, to diminish the causes of failure of health by care and good housekeeping; and thirdly, to increase the time at the disposal of students; thus, on the one hand, affording to the zealous worker opportunities of relaxation, which in different surroundings would be absorbed in housekeeping worries or other occupations, and, on the other hand, enabling the less enthusiastic to add to the quantity of their acquirements without increase of conscious effort. The Hall has been established chiefly in the interests of the students of University College (including the Slade School), but its usefulness is much enhanced by proximity to the London School of Medicine for Women, and the British Museum; for on this account we may fairly hope that it will contain numbers of students in the various departments of Literature, Science, and Medicine, and the Fine Arts. Liberality of thought and breadth of sympathy can hardly fail to be promoted, where subjects of interest are so varied amongst companions united by the common principle of serious study. Although the Hall was only opened last term, we notice with pleasure that all the rooms are already taken; hence there is reasonable ground for hope that the larger scheme of the Committee will before long be realised. That the interests of students of science will be well looked after may be gathered from the fact that the presidents of the Royal Society and of the British Association, Prof. Huxley, Dr. Gladstone, Mr. Samuelson, M.P., Prof. Carey Foster, and others are aiding the scheme. Sir John Lubbock is the treasurer of the Building Fund.

DR. VON HOCHSTETTER, for many years president of the Vienna Geographical Society has resigned this post and has been nominated honorary president for life. In his stead Count Hans Wilczek was elected president.

THE death is announced of Karl Winter, the well-known electrician. He died at Vienna on December 7 last.

PROF. W. GRYLLS ADAMS, F.R.S., will deliver a course of lectures on voltaic and dynamic electricity and magnetism, and their applications to cable-testing, electric lighting, &c., at King's College, London, during the ensuing session. A course of practical work in electrical testing and measurement with especial reference to electrical engineering will also be carried on under his direction in the Wheatstone Laboratory. The lectures will be given once a week on Mondays at 2 p.m., and the laboratory will be open daily (Saturday excepted) from 1 to 4. The work will begin on Monday, January 15.

THE French Senate has diminished by a million of francs (40,000*l.*), the Budget of Public Instruction for 1883. It is regarded as a warning given to the Lower House, not to spend with too free a hand the public funds for educational purposes.

THE continual rains are creating serious apprehensions in Paris, and the Seine has again reached the level of disastrous inundations. A similar calamity is befalling other cities in France, amongst which the foremost is Lyons. The calamity having been foreseen by the Hydrological Service, all measures have been taken to diminish as much as possible the extent of the disaster. *Akhbar* states that heavy rains have been experienced in Algiers, and even at Laghouat, where it has been received with a real exultation. The newspapers are full of the disastrous floods caused by the rise of nearly all the great rivers in the Central European plain.

WITH reference to a recent note to the effect that snow fell on November 11 in Madrid to the depth of 1 foot, Mr. Gillman writes that snow began to descend early that morning, but had ceased at midday. He nowhere found it deeper than 6 inches, but this was uniform in the streets and open country. In the night of 11th–12th, the minimum thermometer marked – 11° cent.; barometer on Sunday stood at 688 millims.

THE appearance within the last two years of two comets has been regarded as a most menacing portent by Chinese politicians. Their resemblance to flaming swords is regarded as emblematical of the vengeance of heaven on an unworthy nation. It is stated that in consequence of the last comet, an urgent decree has been promulgated in the name of the youthful monarch, stating that it is a clear indication that the officials are lax in making proper reports to the Throne, and have been keeping the Emperor in the dark as to pestilences and other calamities among the people. His Majesty has reason to believe that improper officials have been appointed; he has, moreover, subjected his Imperial heart

to a rigorous examination in the seclusion of his palace, and he is much disquieted at the result. The people, he finds, are poverty-stricken, and await relief, and the present is a time of great anxiety and embarrassment. The crisis must be met with prompt measures and a reverent heart; the ministers are accordingly enjoined to exhibit loyalty and justice, and to strenuously guard themselves against the thraldom of official routine. They are to discover the real state of the country, and to make such dispositions as may give rise to all possible advantage, and eradicate all possible evil. If all this be done, we have the Imperial assurance that the people will live in peace and quietness, till heaven be in harmony with earth, and all harmful influences allayed. If decrees were always obeyed, the comet will have exercised a beneficent influence on the condition of the Chinese people.

ALL interested in photography will find much that is useful and curious in Mr. Baden Pritchard's Year-Book of Photography for 1883.

MR. E. ROBERTS has sent us his handy and useful Tide Table for 1883, containing the times of high water at London Bridge, and showing the possible overflows; to all Londoners interested in any way in their river, this table will prove serviceable. We have also from Mr. Roberts Tide Tables for the Indian ports, and Tide Tables for the port of Hongkong, in handy little volumes, containing many carefully compiled tables calculated to be of great service.

THE total number of visitors to the Royal Gardens, Kew, for the year 1882, was 1,244,167. This is 407,491 in excess of the numbers for 1881, which in its turn was greater by 111,254 than the number of visitors in any previous year. As in 1881 the Sunday visitors (606,935) were about equal in number to those on all the other days of the week put together (637,232).

A NEW natural history magazine in the Flemish language is announced. It is published at Ghent, and the title is *Natura Maandschrift voor Natuurwetenschaffen uitgegeven door het Natuurwetenschappelijk Genootschap von Ghent.* The editors are J. MacLeod, Ed. Remonchamps, and L. Baeklandt. The natural sequence is that another Belgian magazine, in Wallon, will appear. The "gift of tongues" is daily becoming more and more a necessity for a working naturalist, and De Candolle's assertion that English is destined to become the language of science seems gradually more remote in realisation.

THE December number of the *Agricultural Students' Gazette*, Royal Agricultural College, Cirencester, contains an article by Sir J. B. Lawes on the future of agricultural field experiments, in which he points out that the time when isolated field experiments were of value has passed, and that now the questions to be solved in this way are such as can only be answered by carefully conducted experiments lasting over many years. Miss Ormerod contributes a paper on the Gooseberry Caterpillar, the larva of *Nematus Ribesii*, in which she suggests the best mode of preventing its ravages. A readable summary of the recent work of Leuckart and Thomas on the life-history of the Fluke is given by Mr. Ozame. The other papers in the number are on Contagious Diseases, by Prof. Garside; on the Harvest of 1882, by Prof. Little; on Butter-making, by Mr. Weber; besides much matter of more purely College interest. We notice that the College has commenced a series of field experiments on corn crops, in conducting which doubtless the advice of Sir J. B. Lawes will be followed. This *Gazette* in its new form promises to become of permanent value, and is exceedingly creditable to its editors, students of the Royal Agricultural College.

THE third expedition fitted out by the Milan Society for the commercial exploration of Africa, will leave early this month for Massana. The leader of the expedition is Signor Bianchi, who knows Abyssinia thoroughly. Count Salimboni accompanies him as engineer, and Prof. Licata as naturalist.

PROF. DOMENICO LOVISATO and Lieut. Bove, who jointly undertook the last Italian Antarctic expedition, are about to undertake another Antarctic journey for scientific purposes.

NEWS has been received from the German traveller, Robert Flegel, who was sent out to explore the Niger-Binue district. It appears that on April 10 last the traveller crossed the Binue River to the southern shore, and reached the large town of Wukari on April 13. By way of Bantadchi he proceeded, in four days' journey, to the decaying government city of Bakundi, in one and a half days more to Beli, and thence he reached Kontcha in the Adamnua district on May 26. From Kontcha to Jola is only a seven days' route. Flegel, whose health has much improved, strongly advises the establishment of a German station in that healthy and fertile country.

WE have on our table the following books :—Sydney Observatory, Double-Star Results, 1871-81 (Sydney); Der Electricität und der Magnetism, vol. i., Clerk Maxwell (Springer, Berlin); Cutting Tools, R. H. Smith (Cassell, Petter, and Galpin); A New Theory of Nature, D. Dewar (W. Reeves); Transactions of the Sanitary Institute, vol. iii. (Stanford); The Great Pyramid, R. A. Proctor (Chatto and Windus); Microbes in Fermentation, Putrefaction, and Disease, Ch. Cameron (Baillière, Tindall, and Co.); The Nebulæ, a Fragment of Astronomical History, A. E. Garrod (Parker); Relative Mortality of Large and Small Hospitals, H. C. Burdett (Churchills), To the Gold Coast for Gold, Burton and Cameron (Chatto and Windus); Physical Optics, R. T. Glazebrook (Longman); Essays in Philosophical Criticism, Seth and Haldane (Longmans); Year-Book of Photography, 1883, H. B. Pritchard (Piper and Carter); Report on the Oban Pennatulida (A. M. Marshall and W. P. Marshall); Catalogue of *Batrachia gradientia*, G. A. Boulenger (British Museum); The Brewer, Distiller, and Wine Manufacturer (Churchills); The Churchman's Almanak for Eight Centuries, W. A. Whitworth (Wells, Gardner, and Co.); Celtic Britain, Prof. J. Rhys (S.P.C.K.); Zoological Record, vol. xviii. 1881 (Van Voorst); Rankine's Useful Rules and Tables, sixth edition (Griffin); Madeira Spectroscopic, C. Piazzi Smyth (W. and A. K. Johnston); Ragnarok, the Age of Fire and Gravel, Ig. Donnelly (Sampson Low and Co.); The Electric Lighting Act, 1882, Clement Higgins and E. W. W. Edwards (W. Clowes).

THE additions to the Zoological Society's Gardens during the past week include a Black-eared Marmoset (*Hapale penicillata* ♂) from South-East Brazil, presented by Miss Tilleard; a Grey Ichneumon (*Herpestes griseus*) from India, presented by Mr. W. L. Brodie; a Rose Hill Parrakeet (*Platycercus eximius*) from Australia, presented by Mr. Geo. Lawson, F.Z.S.; a Black Tortoise (*Testudo carbonaria*) from St. Thomas', West Indies, presented by Viscount Tarbat, F.Z.S.; an Indian Cobra (*Noia tripudians*) from India, presented by Capt. Braddick; two Common Curlews (*Numenius arquata*), a Common Lapwing (*Vanellus cristatus*), a Golden Plover (*Charadrius pluvialis*), British, purchased.

BIOLOGICAL NOTES

ON A NEW GENUS OF CRYPTOPHYCEÆ.—It would appear that the interesting fresh-water genus of Algæ described by Bornet and Grunow as Mazæa (*vide* NATURE, vol. xxvi. p. 557) is without doubt the same as Nostochopsis of Wood. This genus of Wood was first briefly described in the *Proc. Amer. Philos. Soc.*, 1869, and more fully, and with good figures, in the "Fresh-water Algæ of the United States," 1872. The Philadelphia species, *N. lobatus*, Wood, is referred by its discoverer to the Rivulaceæ, and is apparently a different species from that described by Bornet and Grunow from Brazil.